AMENDMENTS TO THE CLAIMS

1-59. (Canceled)

60. (Currently amended) A composite array comprising:

a substrate having a surface;

a first assay location and a second assay location on said surface, said first assay location being separated from said second assay location;

a first plurality of depressions located within said first assay location and a second plurality of depressions located within said second assay location;

a first population of microspheres comprising a bioactive agent, said first population of microspheres randomly distributed at said first assay location and at said second assay location; and

a second population of microspheres comprising blank microspheres, said second population of microspheres randomly distributed at said first assay location and at said second assay location.

61-64. (Canceled)

65. (Previously presented) The composite array of claim 60, wherein said first and second assay locations are separated by a gasket.

66. (Previously presented) The composite array of claim 60, wherein said bioactive agent comprises a nucleic acid.

67. (Previously presented) The composite array of claim 60, wherein said substrate comprises a microscope slide.

68. (Previously presented) The composite array of claim 60, wherein said substrate is enclosed within a hybridization chamber.

69. (Previously presented) The composite array of claim 68, wherein said hybridization chamber comprises a flexible membrane.

70. (Previously presented) The composite array of claim 60, wherein said first and second assay locations are separately enclosed within a first and a second hybridization chamber.

71. (Previously presented) A method of making a composite array comprising:

providing a substrate having a surface;

providing a first assay location and a second assay location on said surface, wherein said first assay location comprises a first plurality of depressions and said second assay location comprises a second plurality of depressions, and wherein said first assay location is separated from said second assay location;

distributing randomly at said first assay location and at said second assay location, a first population of microspheres comprising a first bioactive agent; and

distributing randomly at said first assay location and at said second assay location, a second population of microspheres comprising blank microspheres.

72-75. (Canceled)

76. (Previously presented) The method of claim 71, wherein said first and second assay locations are separated by a gasket.

77. (Previously presented) The method of claim 71, wherein said bioactive agent comprises a nucleic acid.

78. (Previously presented) The method of claim 71, wherein said substrate comprises a microscope slide.

79. (Previously presented) The method of claim 71, wherein said substrate is enclosed within a hybridization chamber.

80. (Previously presented) The method of claim 79, wherein said hybridization chamber comprises a flexible membrane.

81. (Previously presented) The method of claim 71, wherein said first and second assay locations are separately enclosed within a first and a second hybridization chamber.

82. (Previously presented) The method of claim 71, wherein said plurality of first depressions is a plurality of wells.

83. (Previously presented) A composite array comprising:

a substrate having a surface, said surface having depressions located thereon, wherein every depression on said surface either comprises a microsphere comprising a nucleic acid or lacks a microsphere comprising a nucleic acid;

a first assay location and a second assay location on said surface, said first assay location being separated from said second assay location;

a first plurality of depressions located within said first assay location and a second plurality of depressions located within said second assay location;

a first population of microspheres comprising a bioactive agent, said first population of microspheres randomly distributed at said first assay location and at said second assay location; and

a second population of microspheres comprising blank microspheres, said second population of microspheres randomly distributed at said first assay location and at said second assay location.

84-87. (Canceled)

88. (Previously presented) The composite array of claim 83, wherein said first and second assay locations are separated by a gasket.

89. (Currently amended) The composite array of claim 83, wherein said ~~first~~ bioactive agent comprises a nucleic acid.

90. (Previously presented) The composite array of claim 83, wherein said substrate comprises a microscope slide.

91. (Previously presented) The composite array of claim 83, wherein said substrate is enclosed within a hybridization chamber.

92. (Previously presented) The composite array of claim 91, wherein said hybridization chamber comprises a flexible membrane.

93. (Previously presented) The composite array of claim 83, wherein said first and second assay locations are separately enclosed within a first and a second hybridization chamber.

94. (Previously presented) A method of making a composite array comprising:

providing a substrate having a surface, said surface comprising a first assay location comprising a first plurality of depressions and a second assay location comprising a second plurality of depressions, wherein said first assay location is separated from said second assay location;

distributing randomly on said substrate, a first population of microspheres comprising a nucleic acid such that depressions of said first plurality of depressions have a single microsphere from said first population of microspheres associated therewith; and

distributing randomly on said substrate, a second population of microspheres comprising blank microspheres.

95. (Previously presented) The method of claim 94, wherein said second plurality of depressions have microspheres from said first population of microspheres and said second population of microspheres associated therewith.

96. (Previously presented) The method of claim 94, wherein said first plurality of depressions have microspheres from said first population of microspheres and said second population of microspheres associated therewith.

97-100. (Canceled)

101. (Previously presented) The method of claim 94, wherein said first and second assay locations are separated by a gasket.

102. (Previously presented) The method of claim 94, wherein said substrate comprises a microscope slide.

103. (Previously presented) The method of claim 94, wherein said substrate is enclosed within a hybridization chamber.

104. (Previously presented) The method of claim 103, wherein said hybridization chamber comprises a flexible membrane.

105. (Previously presented) The method of claim 94, wherein said first and second assay locations are separately enclosed within a first and a second hybridization chamber.

106. (Previously presented) The method of claim 94, wherein said plurality of first depressions is a plurality of wells.

107. (Previously presented) The method of claim 94 further comprising preparing said nucleic acid using an amplification process.

108. (Previously presented) The method of claim 107, wherein said amplification process comprises PCR.

109. (Previously presented) The method of claim 94 further comprising sequencing said nucleic acid.

110. (Previously presented) The method of claim 109, wherein said sequencing comprises pyrosequencing.

111. (Previously presented) The method of claim 109, wherein said sequencing comprises dideoxysequencing.

112. (Previously presented) The composition of claim 60, wherein said first population of microspheres is distributed such that depressions of said second plurality of depressions have microspheres from said first population of microspheres and said second population of microspheres associated therewith.

113. (Previously presented) The composition of claim 60, wherein said second population of microspheres is distributed such that depressions of said first plurality of depressions have microspheres from said second population of microspheres and said first population of microspheres associated therewith.

114. (Previously presented) The method of claim 71, wherein said first population of microspheres is distributed such that depressions of said second plurality of depressions have microspheres from said first population of microspheres and said second population of microspheres associated therewith.

115. (Previously presented) The method of claim 71, wherein said second population of microspheres is distributed such that depressions of said first plurality of depressions have microspheres from said second population of microspheres and said first population of microspheres associated therewith.

116. (Previously presented) The composition of claim 83, wherein said first population of microspheres is distributed such that depressions of said second plurality of depressions have microspheres from said first population of microspheres and said second population of microspheres associated therewith.

117. (Previously presented) The composition of claim 83, wherein said second population of microspheres is distributed such that depressions of said first plurality of depressions have microspheres from said second population of microspheres and said first population of microspheres associated therewith.

118-125. (Canceled)

126. (Previously presented) The composite array of claim 65, wherein said gasket comprises rubber or silicon.

127. (Previously presented) The composite array of claim 66, wherein said nucleic acid comprises portions of both single stranded and double stranded sequence.

128. (Previously presented) The method of claim 76, wherein said gasket comprises rubber or silicon.

129. (Previously presented) The method of claim 77, wherein said nucleic acid comprises portions of both single stranded and double stranded sequence.

130. (Previously presented) The composite array of claim 88, wherein said gasket comprises rubber or silicon.

131. (Previously presented) The composite array of claim 89, wherein said nucleic acid comprises portions of both single stranded and double stranded sequences.

132. (Previously presented) The method of claim 94, wherein said nucleic acid comprises portions of both single stranded and double stranded sequence.

133. (Previously presented) The method of claim 101, wherein said gasket comprises rubber or silicon.

134. (Previously presented) The method of claim 95, wherein depressions of said second plurality of depressions comprise no more than one microsphere from said first population of microspheres.

135. (Previously presented) The method of claim 96, wherein depressions of said first plurality of depressions comprise no more than one microsphere from said first population of microspheres.

136. (Previously presented) The composition of claim 112, wherein depressions of said second plurality of depressions comprise no more than one microsphere from said first population of microspheres.

137. (Previously presented) The composition of claim 113, wherein depressions of said first plurality of depressions comprise no more than one microsphere from said first population of microspheres.

138. (Previously presented) The method of claim 114, wherein depressions of said second plurality of depressions comprise no more than one microsphere from said first population of microspheres.

139. (Previously presented) The method of claim 115, wherein depressions of said first plurality of depressions comprise no more than one microsphere from said first population of microspheres.

140. (Previously presented) The composition of claim 116, wherein depressions of said second plurality of depressions comprise no more than one microsphere from said first population of microspheres.

141. (Previously presented) The composition of claim 117, wherein depressions of said first plurality of depressions comprise no more than one microsphere from said first population of microspheres.

142. (New) A composite array comprising:

a substrate having a surface;

a first assay location and a second assay location on said surface, said first assay location being separated from said second assay location;

a first plurality of depressions located within said first assay location and a second plurality of depressions located within said second assay location;

a first population of microspheres comprising a bioactive agent each microsphere of said first population of microspheres having a first identifier binding ligand (IBL) and a second IBL attached thereto, said first and second IBLs being different from said bioactive agent, wherein said first population of microspheres is randomly distributed at said first assay location and at said second assay location; and

a second population of microspheres comprising blank microspheres, said second population of microspheres randomly distributed at said first assay location and at said second assay location.

143. (New) The composite array of claim 142, wherein the first IBL is bound to a first decoder binding ligand (DBL) and the second IBL is bound to a second DBL.

144. (New) The composite array of claim 142, wherein the bioactive agent, the first IBL and the second IBL all comprise nucleic acids.

145. (New) The composite array of claim 144, wherein the nucleic acids are oligonucleotides between 8 to 40 nucleotides in length.

146. (New) The composite array of claim 145, wherein none of the nucleic acids are identical to each other in sequence.

147. (New) The composite array of claim 142, wherein said first and second assay locations are separated by a gasket.

148. (New) The composite array of claim 142, wherein said substrate comprises a microscope slide.

149. (New) The composite array of claim 142, wherein said substrate is enclosed within a hybridization chamber.

150. (New) A method of making a composite array comprising:

providing a substrate having a surface;

providing a first assay location and a second assay location on said surface, wherein said first assay location comprises a first plurality of depressions and said second assay location comprises a second plurality of depressions, and wherein said first assay location is separated from said second assay location;

distributing randomly at said first assay location and at said second assay location, a first population of microspheres comprising a bioactive agent, wherein each microsphere of said first population of microspheres has a first identifier binding ligand (IBL) and a second IBL attached thereto, said first and second IBLs being different from said bioactive agent; and

distributing randomly at said first assay location and at said second assay location, a second population of microspheres comprising blank microspheres.

151. (New) The method of claim 150 further comprising contacting the first IBL with a first decoder binding ligand (DBL) and contacting the second IBL with a second DBL.

152. (New) The method of claim 150, wherein the bioactive agent, the first IBL and the second IBL all comprise nucleic acids.

153. (New) The method of claim 152, wherein the nucleic acids are oligonucleotides between 8 to 40 nucleotides in length.

154. (New) The method of claim 153, wherein none of the nucleic acids are identical to each other in sequence.

155. (New) The method of claim 150, wherein said first and second assay locations are separated by a gasket.

156. (New) The method of claim 150, wherein said substrate comprises a microscope slide.

157. (New) The method of claim 150, wherein said substrate is enclosed within a hybridization chamber.